THE CLAIMS:

1. (Previously Presented) A method, comprising:

directing an optical beam into a first end of an optical path having the first end and a second end disposed in a semiconductor substrate;

reflecting a first portion of the optical beam having a first center wavelength back out from the first end of the optical path with first and second pluralities of silicon and polysilicon interfaces, respectively, disposed in the semiconductor substrate along the optical path between the first end and the second end, the first and second pluralities of silicon and polysilicon interfaces oriented substantially perpendicular to the semiconductor substrate; and

tuning the optical path to reflect a second portion of the optical beam having a second center wavelength back out from the first end of the optical path.

2. (Original) The method of claim 1 further comprising confining the optical beam to remain within the optical path between the first and second ends with an optical waveguide disposed in the semiconductor substrate between the first and second ends.

3. (Cancelled)

4. (Previously Presented) The method of claim 1 wherein tuning the optical path

comprises adjusting a temperature of the first and second pluralities of silicon and polysilicon interfaces with a heater disposed proximate to the optical path through the semiconductor substrate.

5. – 6. (Cancelled)

7. (Previously Presented) The method of claim 1 wherein the first and second pluralities of silicon and polysilicon interfaces in the semiconductor substrate along the optical path form a Bragg grating.

8. – 29. (Cancelled)

30. (Previously Presented) A method, comprising:

directing an optical beam into a first end of an optical path having the first end and a second end disposed in a semiconductor substrate;

reflecting a first portion of the optical beam having a first center wavelength back out from the first end of the optical path by perturbing an effective index of refraction a plurality of times along the optical path with a plurality of insulated conductor structures protruding into the optical path; and

tuning the optical path to reflect a second portion of the optical beam having a second center wavelength back out from the first end of the optical path.

31. (Previously Presented) The method of claim 30 wherein perturbing the effective index of refraction the plurality of times along the optical path comprises applying a voltage to the plurality of insulated conductor structures to perturb a concentration of free charge carriers a plurality of times along the optical path.

32. (Previously Presented) The method of claim 30 wherein tuning the optical path comprises modulating charge in the optical path by modulating a voltage applied to the insulated conductor structures.

33. (Previously Presented) The method of claim 30, further comprising confining the optical beam to remain within the optical path between the first and second ends with an optical waveguide disposed in the semiconductor substrate between the first and second ends.

34. (Previously Presented) The method of claim 32 wherein confining the optical beam with the optical waveguide comprises forming the optical waveguide with dielectric layers of a silicon-on-insulator wafer.

35. (Previously Presented) The method of claim 30 wherein perturbing an effective index of refraction a plurality of times along the optical path with a

plurality of insulated conductor structures protruding into the optical path forms a Bragg grating.

36. (Previously Presented) The method of claim 2 wherein confining the optical beam to remain within the optical waveguide comprises forming the optical waveguide with dielectric layers of a silicon-on-insulator wafer.

37. (Previously Presented) A method, comprising:

directing an optical beam into a first end of an optical path having the first end and a second end disposed in a semiconductor substrate;

reflecting a first portion of the optical beam having a first center wavelength back out from the first end of the optical path with at least three silicon and polysilicon interfaces disposed in the semiconductor substrate along the optical path between the first end and the second end, the at least three silicon and polysilicon interfaces forming a Bragg grating; and

tuning the at least three silicon and polysilicon interfaces to reflect a second portion of the optical beam having a second center wavelength back out from the first end of the optical path.

38. (Previously Presented) The method of claim 37 wherein the at least three silicon and polysilicon interfaces are oriented substantially perpendicular to the

semiconductor substrate.

39. (Previously Presented) The method of claim 38 wherein tuning the at least three silicon and polysilicon interfaces comprises adjusting a temperature of the at least three silicon and polysilicon interfaces with a heater disposed proximate to the optical path through the semiconductor substrate.

40. (Previously Presented) A method, comprising:

directing an optical beam into a first end of an optical path having the first end and a second end disposed in a semiconductor substrate;

establishing a Bragg grating within the optical path with a plurality of electrodes positioned to perturb an effective index of refraction a plurality of times along a direction of propagation through the optical path;

reflecting a first portion of the optical beam having a first center wavelength back out from the first end of the optical path with the Bragg grating; and

tuning the Bragg grating to reflect a second portion of the optical beam having a second center wavelength back out from the first end of the optical path.

41. (Previously Presented) The method of claim 40 wherein establishing the Bragg grating within the optical path comprises applying a voltage to the plurality

of electrodes to perturb a concentration of free charge carriers a plurality of times along the optical path.

42. (Previously Presented) The method of claim 41, wherein tuning the Bragg grating comprises modulating charge in the optical path by modulating the voltage applied to the plurality of electrodes.

43. (Previously Presented) The method of claim 41, further comprising confining the optical beam to remain within the optical path between the first and second ends with an optical waveguide disposed in the semiconductor substrate between the first and second ends.